

REMARKS

Amendments to the Specification

This paper is in response to the Official Action issued by the Examiner on September 30, 2008. Currently claims 1 to 37 are pending in the application.

The Examiner has objected to claims 1, 11, 20 and 31 because these claims recite density in “grams per cubic centimeter” for specific gravity which is the ratio of the density of a solid or liquid to the density of water and therefore by definition is a dimensionless number, and therefore the Examiner has required this phrase be removed. Responsively, claims 1, 11, 20 and 31 have been amended pursuant to the Examiner’s suggestion so that now the claims recite specific gravity which is unitless, rather than density in grams/cm³. Claim 20 has also been amended to insert –and a specific gravity of ...--

For consistency, page 14 of the Detailed Description has been amended to also conform the units to “density” and not “specific gravity” on lines 3 and 16, while specific gravity units are being used in the claims so that the units used in the claims are the same as used in the cited reference so that the numbers can be directly compared between present claim 1 and Gardner. It is noted that specific gravity is the density of the material divided by the density of water (=1) so that the number remains the same when converting density to specific gravity, as pointed out by the Examiner. Applicants thank the Examiner for pointing out this inconsistency. Further amendments have been made in these passages to refer to “specific gravity” with respect to the composite as a whole and refer to “density” for individual materials.

Page 9 has been amended to add:

"As used herein, the term "soft elastomeric polymer"

in order to be grammatically consistent.

Claims 1 and 27 have been amended to recite:

"a polymer matrix including at least one thermoplastic elastomeric polymer (TPE) component, and at least one soft elastomeric polymer component that at ambient temperatures is above its glass transition temperature"

This limitation is taken directly from the description as filed, see page 9, lines 5 to 6. The Summary of Invention has been amended to be commensurate with amended claims 1 and 17.

Claim 6 has been amended to recite:

"and wherein the thermoplastic elastomeric polymer (TPE) component is polystyrene-polyisobutylene-polystyrene poly(styrene-b-isobutylene-b-styrene)."

which is the correct IUPAC convention for the name of the compound. Similarly, claim 7 has been amended to recite:

~~"polystyrene-polyisobutylene-polystyrene poly(styrene-b-isobutylene-b-styrene)"~~

to use the correct compound name. The other amendments are to avoid antecedent problems and for language consistency.

As discussed with the Examiner at the interview, claims 2 and 5 are switched and the claim dependencies amended to depend from claim 2, which subject matter includes a commercial embodiment of the invention and further the ranges recited in the dependent claims relate to examples using constituents from claim 1 in the composite.

Summary of the In-Person Interview

On February 25, 2009, an in-person interview was conducted by Examiner Bret Hayes with Applicants' representatives Ralph Dowell, Lynn C. Schumacher, and Applicant/inventor Judit E. Puskas. Applicant and Applicants' representatives would like to thank Examiner Hayes for taking the time to meet with them.

Four exhibits were shown, three rubber balls and a less lethal bullet were presented to the Examiner. Two of the balls were standard rubber balls and the third was produced using one of the constituents from claim 2. A demonstration was conducted in which the inventor/applicant Judit E. Puskas dropped the two standard rubber balls which bounced quite high when dropped onto the table top. In stark contrast, the third ball produced with one of the constituents from claims 1 and 2 was dropped onto the table it did not bounce but hit the table and absorbed enough kinetic energy within the ball itself so that it did not bounce. The same effect was observed with

the “less lethal” bullet. A sketch was shown to the Examiner comparing the two different products in Gardner and present claim 1 and the differences were discussed.

Applicants’ representatives and the Examiner discussed independent claim 1 along with the Gardner et al. reference (US Patent No. 5,786,416). Applicants’ arguments as to the patentability of those claims over the Gardner et al. are set forth below. No agreement was reached as to the patentability of the claims, as the Examiner indicated that he needed to consider the Applicants’ response including written arguments.

Patentability over the Cited Reference

The Examiner has rejected claims 1 to 19, and 21 to 37 under 35 U.S.C. 102(b), as anticipated by, or in the alternative, under 103(a) as being unpatentable over Gardner et al. reference (US Patent No. 5,786,416). Applicants respectfully request withdrawal of this rejection in view of the following comments and observations regarding the differences between the subject matter of claim 1 and the cited reference.

As a general observation of the teachings of Gardner and as discussed at the interview, Gardner is clearly directed to polymer based alternatives to lead in the manufacture of bullets, see column 1, lines 9 to 16, particularly line 11-12. This is also discussed in column 2, lines 17 to 23 where it is clear this polymer material of Gardner is meant to be a lethal alternative to lead bullets. The Examiner’s direction is also directed to column 3, lines 29 to 43, particularly line 41 to 43 stating clearly the composite has properties of hardness comparable to lead or lead alloys.

The Examiner's attention is particularly directed to column 6, the paragraph from lines 29 to 42, particularly lines 29 to 36 discussing the Shore Hardness range of Gardner's bullets is from 55 to 85 and he notes 55 or less gives materials too soft to produce bullets which kill. Applicants claim 17 clearly recites:

“The polymer-based ammunition according to claim 1 having a hardness value, as measured according to the Shore A scale, in a range of from about 30 to about 55.”

so that Gardner clearly, not only does not anticipate the subject matter of claim 1, but also teaches away from the composition of claim 1.

More particularly, the formulation of Applicants claim 1 is distinctively different from Gardner in that present claim 1 recites:

“a polymer matrix including at least one thermoplastic elastomeric polymer (TPE) component, and at least one soft elastomeric polymer component that at ambient temperatures is above its glass transition temperature”

In direct contrast, Gardner discloses a polymer composite material having a “rigid thermoplastic polymer” and an “elastomeric thermoplastic material”. The thermoplastic elastomeric polymer (TPE) component of Applicants claim 1 is similar in nature to Gardner's “elastomeric thermoplastic material”.

However, the “rigid thermoplastic polymer” of Gardner is defined in column 3, lines 47 to 56:

“As used herein, the term “rigid thermoplastic polymer” means a thermoplastic polymer which at ambient temperatures is below its first order, and preferably below its second order, transition temperature. In other words, this material is one which at ambient temperatures is a solid having an amorphous, or more preferably a crystalline, structure. It is this component of the polymer matrix which is primarily responsible for the hardness and strength characteristics of the final composition.”

Thus, the “soft elastomeric polymer component” of Applicants claim 1 is quite different from Gardner’s “rigid thermoplastic polymer” and while Gardner’s “rigid thermoplastic polymer” gives the bullets their hardness to approximate lead, Applicants “soft elastomeric polymer component” gives their ammunition its less lethal quality that allows the bullet to absorb most of its own kinetic energy upon impact rather than transferring the kinetic energy to the object being shot.

As discussed at the interview, the “soft elastomeric polymer component” of Applicants claim 1 essentially forms a matrix in which the “thermoplastic elastomeric polymer” is encapsulated while the “rigid thermoplastic polymer” of Gardner essentially forms a matrix in which the “elastomeric thermoplastic material” of Gardner is encapsulated. This is why Gardner’s ammunition is lethal whereas Applicants’ ammunition is not designed to kill.

Another difference between Gardner and the subject matter of claim 1 is the specific gravity of the final composite, Gardner clearly discloses a specific gravity of 4 or more needed to obtain lethality, while present claim 1 recites a specific gravity between 2 to 3.

In view of the above-noted differences, Applicants respectfully submit the subject matter of the present claims, particularly claims 1 and 17 are not disclosed in Gardner and further one of ordinary skill in the art would not be led to the subject matter of claims 1 and 17 based on a knowledge of Gardner, so that the present claims are novel and inventive over Gardner.

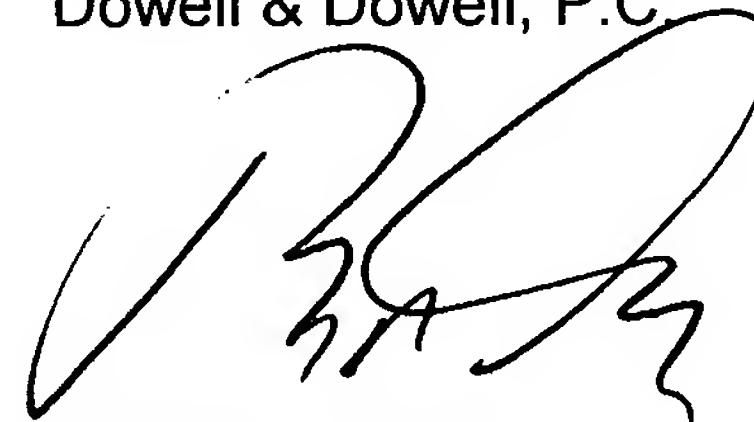
Conclusion

In view of the foregoing comments on the differences between the present claims and the cited references, Applicants respectfully submit the present claims recite patentable subject matter and request withdrawal of all the rejections. An earnest effort has been made to place this application in condition for allowance which action is respectfully solicited.

Should the Examiner have any questions concerning this election, it would be appreciated if the Examiner would contact the undersigned attorney-of-record at the telephone number shown below for further expediting the prosecution of the application.

Respectfully submitted,
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